



Department of  
Toxic Substances  
Control

Preventing  
environmental  
damage from  
hazardous waste,  
and restoring  
contaminated  
sites for all  
Californians.



State of California



California  
Environmental  
Protection Agency

Fact Sheet, December 2006

# STRINGFELLOW SUPERFUND SITE PERCHLORATE RI/FS UPDATE

The Department of Toxic Substances Control (DTSC) is sending this fact sheet to update you on investigations into contaminated groundwater from the Stringfellow Superfund Site (Site) in Glen Avon. DTSC is the lead state agency conducting actions to protect residents and the environment from hazardous wastes left behind at the Site. This fact sheet contains information concerning perchlorate contamination in groundwater from the Site, Site history, Site investigations, future Site activities, DTSC contacts and mailing list information.

## What is Perchlorate?

Perchlorate is a salt consisting of four oxygen atoms and one chlorine atom. In solid form, it is most commonly found as ammonium perchlorate. It is used in solid fuel rockets, matches, and other applications, because it provides the oxygen that the rocket or match needs to burn. When any perchlorate salt, such as ammonium perchlorate is dissolved in groundwater, the perchlorate is freed from the ammonium and the perchlorate ion moves with the groundwater. Ammonium does not move freely in the groundwater.

Over the last several years, scientists have developed new analytical techniques that have permitted the detection of perchlorate in water at levels as low as one part per billion (ppb). As a result, DTSC is now able to detect perchlorate in groundwater where previously we could not.

Perchlorate impacts human health by interfering with iodide uptake into the thyroid gland. In adults, the thyroid gland helps regulate the metabolism by releasing hormones, while in children, the thyroid helps in proper development.

In March 2004, Cal/EPA's Office of Environmental Health Hazard Assessment (OEHHA) published a public health goal (PHG) of 6 parts per billion (ppb) for perchlorate in drinking water. The 6 ppb goal is currently the level that triggers cleanup for groundwater in California. The California Department of Health Services is currently proposing that the Maximum Contaminant Level (MCL) for perchlorate in drinking water be set at 6 ppb.

## History of the Stringfellow Site

Stringfellow was a hazardous waste disposal site located in Pyrite Canyon, north of Highway 60. The waste disposal site operated from 1956 to 1972 and received about 35 million gallons of hazardous waste. In the early 1980s, the Regional Water Quality Control Board - Santa Ana Region drained the ponds and capped the site. Since 1986, the United States Environmental Protection Agency (U.S. EPA) and DTSC have installed hundreds of groundwater monitoring and extraction wells and several treatment plants to contain and remediate contaminated groundwater migrating from the site.



In the early 1990s, DTSC installed a series of groundwater extraction wells in the trichloroethylene (TCE) plume south of Highway 60. As a result of the operation of these wells, the area of TCE contaminated water south of Highway 60 has been significantly reduced to only a few isolated areas that exceed 5 ppb (the maximum contaminant level allowed in drinking water). Perchlorate is still present in the groundwater though, and is the primary subject of this fact sheet.

### **Perchlorate in Ground Water at Stringfellow**

In 2001, perchlorate was detected in groundwater south of Highway 60. Immediately after the perchlorate was detected, residents not already on Jurupa Community Services District water were provided with bottled water, and DTSC contracted to install mains, laterals, meters, and hookups at each residence. DTSC is conducting a remedial investigation to determine the extent and sources of perchlorate detected in groundwater in this area.

### **The Remedial Investigation**

DTSC began investigations of perchlorate disposal, occurrence, concentrations, migration, and sources immediately after the initial discovery. To date approximately 900 groundwater and surface water samples have been taken between Highway 60 and the Santa Ana River. In addition, DTSC studied the geology and relative depth of the groundwater to determine the direction of groundwater flow.

Perchlorate has been detected in most of the groundwater samples collected in the Glen Avon area. The concentrations range from a high of about 70 ppb to less than 0.5 ppb. Within the area of the groundwater investigation south of Highway 60 almost all of the samples have detectable levels of perchlorate.

Analyses of the direction of groundwater flow and occurrence of perchlorate suggests that there is a central plume of perchlorate that is coming from Pyrite Canyon. Sources of perchlorate in Pyrite Canyon include the Stringfellow site and other potential discharges. The central plume, represented by perchlorate concentrations greater than 12 ppb, is displayed by shading on the included map. Outside of the central plume area and within the overall area of investigation, there are widely varying levels of perchlorate that do not indicate one centralized source. Other sources could include nitrate fertilizers, fireworks, blasting, and road flares. DTSC plans additional investigation to identify other potential sources.

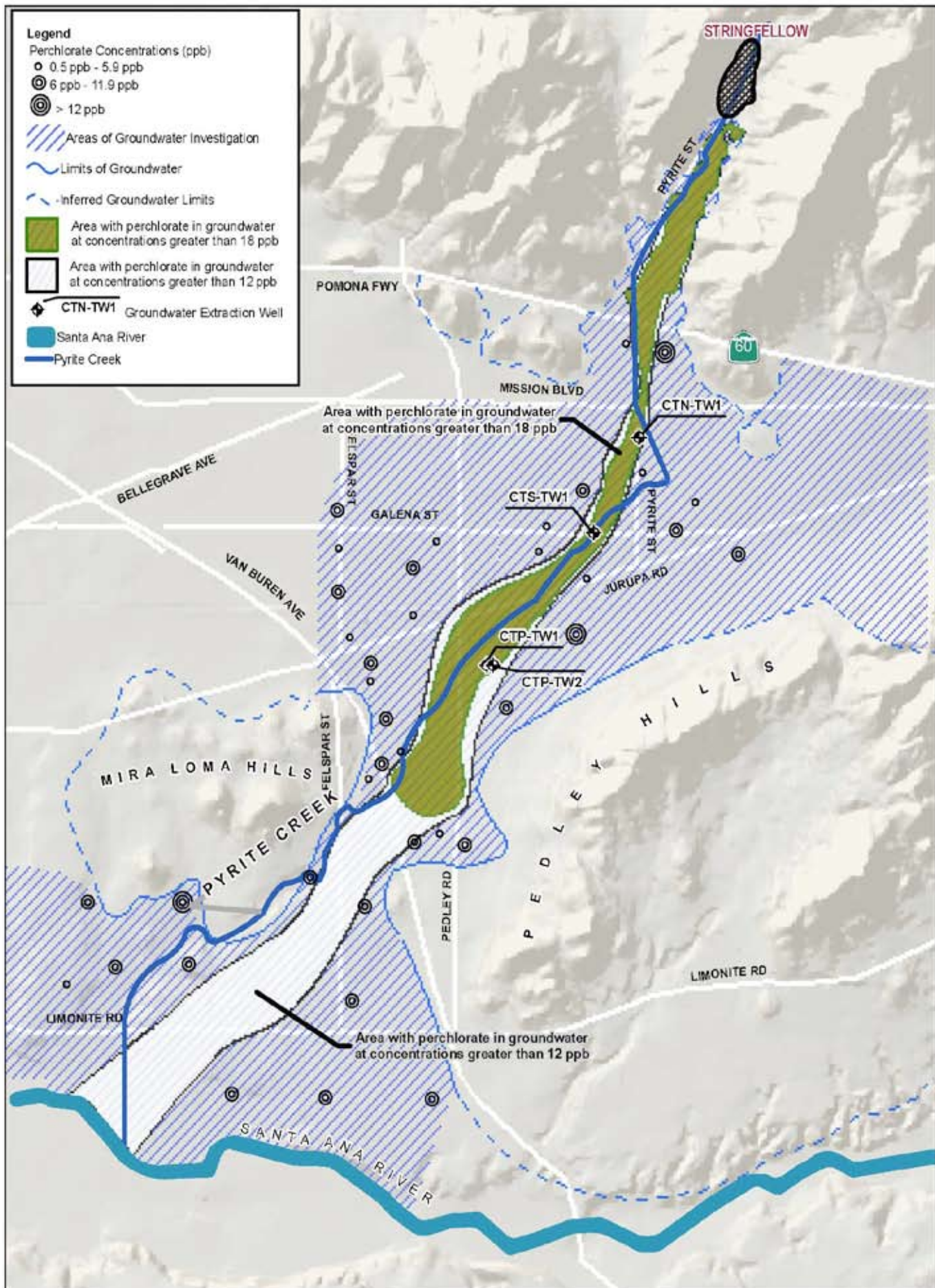
### **Potential Sources of Perchlorate**

Wastes were brought to Stringfellow from users and/or manufacturers of rocket fuel and placed in unlined ponds for evaporation. The liquids seeped into the groundwater and were carried south beneath Glen Avon. Data collected to date suggest that this perchlorate is confined to the shaded area of the map with perchlorate concentrations greater than 12 ppb.

Quarry operations in Pyrite Canyon may have used explosives that contained perchlorate. Perchlorate has been detected in runoff from the quarry and may have seeped into the groundwater. Quarry operations in Pyrite Canyon have been ongoing since 1904.

Perchlorate is a natural component of mineral nitrate fertilizers that were imported for agricultural applications. Land use in the Glen Avon area was primarily agricultural for much of the 20th Century, and many tons of mineral nitrate fertilizers were used over time. Irrigation water may have been imported from sources now known to contain perchlorate. Known sources of water containing perchlorate that have been or are currently imported to the Glen Avon area include Colton, quarry ponds, and the Colorado River.

Perchlorate has also been identified as a natural compound that can be generated in the atmosphere and brought to the ground with rainfall. In arid zones, perchlorate can concentrate in soils and plants.





## Community Concerns

Unlike the other contaminants from the site (trichloroethylene and chloroform), perchlorate does not become a vapor when exposed to the air. Consequently, there are no health hazards associated with vapor migration and intrusion into indoor air or buildings.

Studies have shown that a variety of fruits and vegetables such as lettuce have a tendency to concentrate perchlorate when irrigated with water that contains perchlorate. The upcoming risk assessment will evaluate the potential for perchlorate exposure from ingesting garden grown fruits and vegetables irrigated with water from domestic wells that contain perchlorate.

## What's Next?

A risk assessment will be prepared to characterize and evaluate the potential risk to human health and the environment. The results of the risk assessment will be used to evaluate implementing and designing remedial actions. DTSC is conducting additional work to identify and evaluate other possible sources of perchlorate that are likely contributing to the perchlorate observed within the area investigated by the remedial investigation.

A feasibility study will be conducted to evaluate available treatment technologies to reduce the levels of perchlorate detected in groundwater. These technologies will be evaluated in terms of effectiveness, costs, ease of implementation, and acceptability.

## Planned Schedule

The current schedule calls for DTSC to finish the remedial investigation/feasibility study (RI/FS) by December 2008. Upon completion of the RI/FS, a recommended plan will be selected and a Record of Decision (ROD) will be prepared and issued by U.S. EPA by December 2009.

## Other Stringfellow Site Activities

DTSC operates a pretreatment plant in Pyrite Canyon to treat groundwater extracted from the Stringfellow Site. DTSC is currently conducting pilot tests as part of the design of a new pretreatment plant. The new pretreatment plant is scheduled to be constructed and operational in 2012. A fact sheet on construction of the new pretreatment plant will be prepared at the conclusion of pilot scale test that is currently underway.

A revised draft supplemental feasibility study (SFS) is currently being prepared to finalize the evaluation of remedies for the former disposal site and arrive at a proposed plan that addresses the regulatory requirements and the concerns of the community. The SFS will address a new landfill cap over Zone 1 and the optimization of the extraction systems in Zones 2 and 3. The expected completion date of the SFS is March 2007. An amendment to ROD 4 will be prepared based on the SFS. The expected completion date of the ROD Amendment is March 2008.

## U.S. Environmental Protection Agency Five-Year Review

The U.S. EPA has completed the third five-year review of remedial measures at the Stringfellow Site. The purpose of the review was to evaluate if implemented remedial measures at the Site are protective of human health and the environment. The five-year review determined that the remedy for the site is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. The final remedy for the Site will be implemented to insure long-term protectiveness.

Copies of the Third Five-Year Review Report for the Stringfellow Superfund Site are located in the following information repositories:

Glen Avon Branch Library  
4810 Pedley Road  
Riverside, CA 92509  
(909) 685-8122

Riverside Public Library  
3581 7th Street  
Riverside, CA 92501  
(909) 782-5203

**For More Information**

If you would like to leave a message on the local Stringfellow hotline, please call (951) 782-4267, and a DTSC staff member will get back to you.

**Notice to the Hearing Impaired**

You can obtain additional information by using the California State Relay Service at 1-888-877-5378 (TDD). Ask them to contact Jesus Cruz at (916) 255-3315 regarding the Stringfellow Superfund site

**Anuncio**

Si prefiere hablar con alguien en español acerca de ésta información, favor de llamar a Jesus Cruz, Departamento de Control de Sustancias Tóxicas. El número de teléfono es (916) 255-3315.

**Stringfellow Site Mailing List**

Please add me to the Stringfellow Superfund Site mailing list. DTSC mailing lists are solely for the purpose of keeping persons informed of DTSC activities. Mailing lists are not routinely released to outside parties. However, they are considered public records and, if requested, may be subject to release.

Name:

Mailing Address:

City:

State:

Zip:

Representing:

Phone number:

E-mail: